

Pianola To MIDI Version 2 User's Guide



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Introduction

What is the program for?

The purpose of **Pianola to MIDI version 2** is to enable you to convert music stored on paper rolls for playing on [pianolas](#) (or [player pianos](#)) to music stored electronically as [MIDI](#) files for playing on devices like computers and [MIDI sequencers](#).

How is this done?

This is done via the following steps

1. Photograph or scan the pianola roll

Before even starting the program you need to photograph or scan the paper roll to a series of [JPEG](#), [TIFF](#) or [BMP](#) images stored on your computer

2. Organise the photographed or scanned images

In the program, you organise the images to create a [virtual pianola roll](#) on your computer screen

3. Mark the start and end of each note

Working your way through the music, you then mark the [start](#) and end (or [stop](#)) of each note on the virtual pianola roll

4. Adjust speed and volume

You can also adjust the speed and volume through the [virtual pianola roll](#) to create loud or soft and fast or slow sections of music.

5. Export the music as a MIDI file

Finally, you export the music as a [MIDI](#) file and then play that file using any compatible MIDI or multimedia player hardware or software.

These steps are explained in more detail in the [“Steps to Convert a Pianola Roll”](#) section.

Other features

This program also enables you to import “Pianola to MIDI Version 1” files (with the filename extension [“.PIO”](#)). These files were created using an earlier version of this program written in 2004. These files do not include any data relating to adjusting speed and volume through a piece of music (step 4 above).

Therefore using **Pianola to MIDI version 2** you can adjust the speed and volume for different sections of the imported music and export it as a [MIDI](#) file containing these changes.

This is explained in more detail in the [“Importing a Pianola to MIDI Version 1 File”](#) section.

Technical details

System requirements

Pianola to MIDI version 2 has been written to run on Windows XP and it has been tested on both Windows XP and Windows Vista.

It will not work on standard Windows 95 or 98 because the program uses [Unicode](#) text and that is not supported on the standard versions of Windows 95 and 98.

Theoretically the program should work on Windows 2000.

Installing the program

The program does not install itself automatically. Therefore you need to carry out the following steps.

1. It is advisable to create a new folder in your computer's programs folders. You can do this using Windows Explorer. For example, the new folder could have the following path: "C:\Program Files\PianolaToMIDI2\"
2. Then download the [EXE](#) file from the website www.gilesdarling.me.uk into the new folder.
3. You might also wish to create a short-cut to the program on your desktop. Refer to Windows Help if you need to find out how to create a desktop short-cut.
4. Before starting the program it is worthwhile scanning the [EXE](#) file using your computer's anti-virus software to check that the EXE file does not contain any viruses or other potential security problems.

The **Pianola to MIDI version 2** EXE file and the sample data files have been scanned using both Norton 360 and AVG anti-virus software and these programs did not identify any viruses or other potential security problems included in these files.

Starting the program

There are a number of ways you can start **Pianola to MIDI version 2**.

1. If you have created a desktop short-cut you can double-click on that short-cut to start the program.
2. Use Windows Explorer to go to the folder holding the program's [EXE](#) file and then double-click on the EXE file.
3. Alternatively, on Windows XP you can use the "Run" keyword on the "Start" icon menu and select "Browse" to find the program's EXE file and then click on "OK".

On some computers it will be necessary to confirm that you wish to run the program because Windows will tell you that the program has come from an unknown or non-trusted source.

Program files

The **Pianola to MIDI version 2** program consists of a single [EXE](#) file. The program was written in C++ using Microsoft Visual Studio 2005 and it uses the Windows Multimedia and Windows GDI+ modules. The program uses the standard Windows library support files, which should include the multimedia and GDI+ modules.

The program itself does not store any information in your computer's [Registry](#) nor any other folders.

Data created by the program can be saved as Pianola-To-MIDI data files which will have the filename extension [“.P2M”](#). A sample P2M file is available to enable you to try out all the program's features. Refer to the section [“Sample Pianola to MIDI Version 2 File”](#).

Uninstalling the program

Because **Pianola to MIDI version 2** does not store any information in your computer's [Registry](#) or any other folders (other than the [P2M](#) and [MIDI](#) files you yourself create) it is very simple to uninstall the program:

1. If you have created a desktop short-cut you need to delete that desktop short-cut.
2. You will need to delete the [EXE](#) file.
3. If you created a folder specifically for the program's EXE file then you will also need to delete that folder.

Checking the program version

To check which version of the program you are using select “*Help*” from the program's menu bar and click on “*About...*”. The dialog box in the figure below will appear showing the program version.

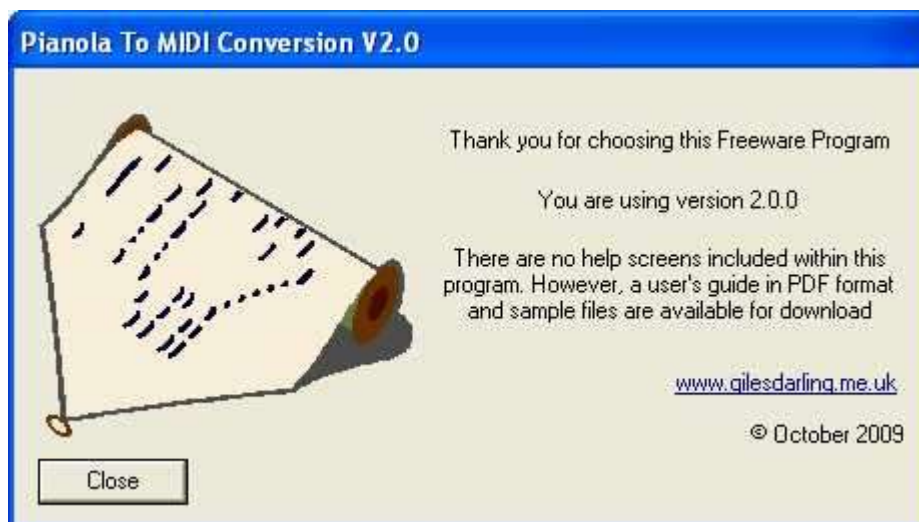


Figure 1
Showing the
program version

This dialog box also contains a link to the website www.gilesdarling.me.uk. Click on the web address on the dialog box if you wish to go to the program's website.

The version number is made up of three components:

1. The first component represents the re-write version and it is increased each time there is a major re-write of the program. Currently this is Version 2. There are no plans at present to write or release Version 3.
2. The second component represents the data structure of the Pianola-To-MIDI data file ([.P2M](#) file) that is created by this version of program. This is increased each time changes to the program mean that there are changes to the data structure of the saved P2M file.

“Version 2.*N*” of the program will be able to read all previous version P2M files (from 2.0 to 2.*N-1*) successfully. However, “Version 2.*N-1*” will not necessarily be able to read “Version 2.*N*” P2M files successfully.

The first (and last) eight bytes of each P2M file contain the data version in [ANSI/ASCII](#) format.

3. The third component is increased each time there are minor changes to the program. These changes will have taken place in order to fix any bugs or problems encountered. If any program changes result in changes to the data structure of saved data then the second component is increase instead and the third component reverts to zero.

Customer Support

Pianola to MIDI Version 2 is a [Freeware](#) program. It is a Freeware program, as opposed to a [Shareware](#) program, because there is no customer support other than this user guide and the sample P2M file.

If you encounter a bug that you can recreate, and if it is not covered by this User Guide (see [“Troubleshooting and Known Program Problems”](#)), please feel free to leave a comment at www.gilesdarling.me.uk.

If a bug can be fixed an updated version of **Pianola to MIDI Version 2** will be uploaded to the website once the bug has been fixed. If a bug cannot be fixed then the [“Troubleshooting and Known Program Problems”](#) section of this User Guide will be updated to suggest ways to get round the bug.

Please also leave a comment at www.gilesdarling.me.uk if you identify an error with the contents of this user guide.

Steps to Convert a Pianola Roll

Step 1. Photograph or scan the pianola roll

Pianola to MIDI Version 2 uses a [virtual pianola roll](#) on the computer screen for you to work with. Therefore you need to transfer your physical [pianola roll](#) into this virtual pianola roll, which is formed from a series of adjacent images.

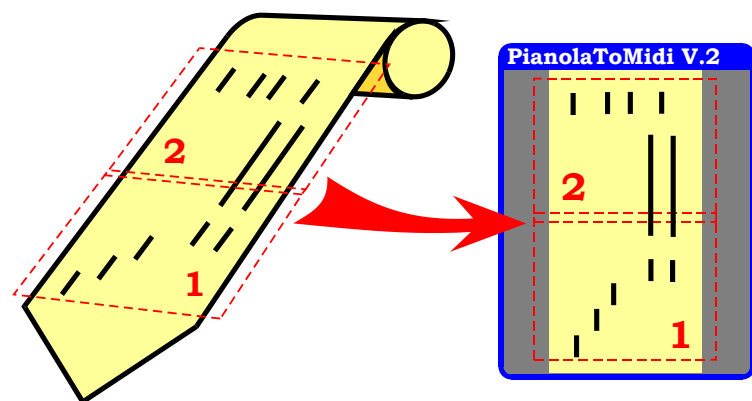


Figure 2

Transferring your physical pianola roll to a virtual pianola roll via a series of adjacent images.

There are a number of ways to do this. The two principal methods use either a digital camera or a [scanner](#). There are advantages and disadvantages for each method.

Using a digital camera

If you have a digital camera this can be a quick and easy method to transfer your physical pianola roll to your computer.

The advantage of a digital camera is that you can photograph any width of pianola roll easily. For wider pianola rolls you just position your camera further away from the roll.

However, a disadvantage of using a camera is that it can be difficult to maintain the same scale between adjacent images. Moving your camera between each photograph, thereby changing the distance between your camera and the pianola roll, will change the scale.

If the scale changes then the notes won't line up on the virtual pianola roll on the computer screen and this could affect the final music. You can keep a constant scale by mounting your camera on a tripod, as shown below, to fix the distance between the pianola roll and the camera.

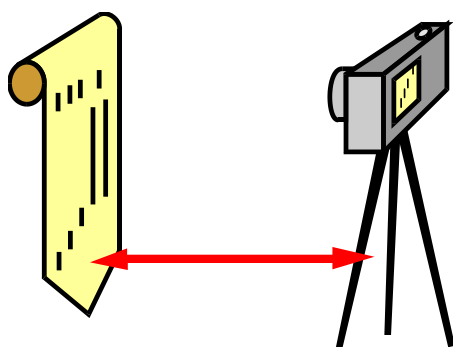


Figure 3

Using a tripod to fix the position of your digital camera and keep the distance constant between the camera and the pianola roll.

If you have a suitable tripod it would be better (and easier) to lay the pianola roll flat on a table and fix your camera so that it looks down at the pianola roll instead of across at the pianola roll as shown here.

Another disadvantage of using a camera is that towards the edges of each photograph the image bends slightly. This is unavoidable and is due to the camera lens. It can be made worse if an improper amount of zoom is used, or when using some specialist lenses for focusing on close up items.

It is worth experimenting with different settings to see which reduces the bending the most – for example positioning the camera close to the pianola roll and using no zoom, or positioning the camera further away from the pianola roll and zooming in.

The bending makes it more difficult to align the images on your [virtual pianola roll](#) on the computer screen and this could affect the final music.

While you will notice the bending, you should be able to work round it when aligning your images. If the bending is too extreme you could try using photo-editing software to “unbend” your images after taking them, but before including them in your virtual pianola roll.

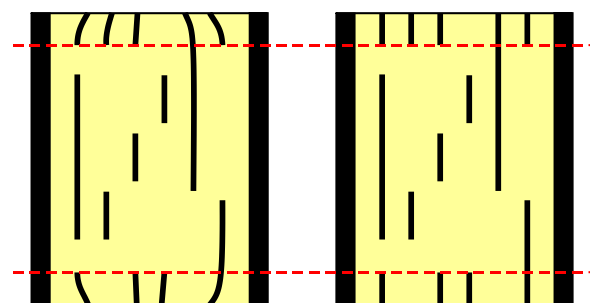


Figure 4

Comparison of image with bending at the edges (on the left) and no bending (on the right).

Note that despite the bending the positions of [holes](#) along the pianola roll will often not be affected by the bending (except at the very edge).

Using a scanner

If you have a [scanner](#) (particularly a [flatbed scanner](#)) attached to your computer this can be a convenient method to transfer your physical [pianola roll](#) to your computer. *Remember to place the pianola roll face down.*

The principal advantages of using a scanner are that it is much easier to maintain the same scale between adjacent scans, and there is no bending at the edges of your scanned images (see the section [“Using a digital camera”](#) above, for explanations of scale and bending problems).

The disadvantage of a scanner is that often the width of a pianola roll is bigger than the maximum dimension that a scanner can scan. There are a number of ways around this as described below.

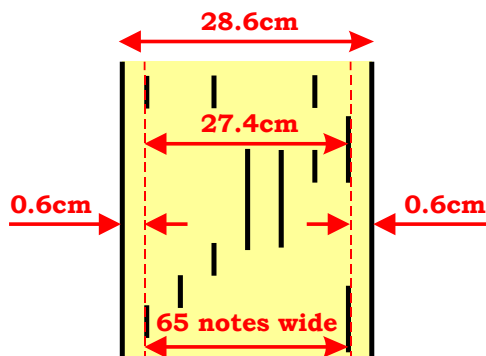


Figure 5

Dimensions of a typical pianola roll.

A typical [65-note pianola roll](#) is 28.6cm (11.26 inches) wide and it has 0.6cm margins (0.24 inches) each side between the edges of the roll and the lowest and highest notes. Therefore the central 27.4cm (10.79 inches) contains the note information.

A typical [flatbed scanner](#) can scan items with a maximum dimension of up to 29.7cm (11.69 inches), although it is usually slightly smaller because of the margin round the side. Therefore it should be possible to scan the pianola roll, but it will be a tight fit, particularly if you also wish to scan one edge of the pianola roll to ensure correct relative alignment between adjacent images (see [“Useful Tips”](#) below).

If your [pianola roll](#) is too wide for your scanner, there are a number of options you could follow.

1. You could find a friend with a large format scanner (e.g. [A3](#) size) and ask to borrow it from them.
2. You could scan your pianola roll in two halves – left side and right side. These images will work with **Pianola to MIDI Version 2** but you can use photo-editing software to stitch the two halves together if you prefer to have a single image spanning the whole width of your pianola roll.

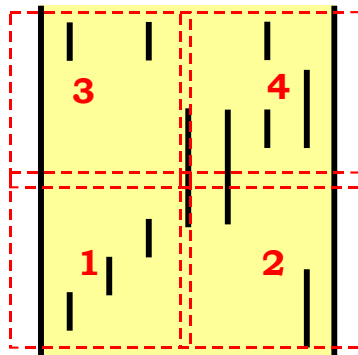


Figure 6

Scanning a pianola roll in two halves. Scans 1 and 3 are the left-hand side. Scans 2 and 4 are the right-hand side.

Compare this to Figure 2 where each scan includes the whole width of the pianola roll.

3. You could photocopy your pianola roll, setting the photocopier to reduce the scale on the printed sheets, and then scan the reduced-scale printed sheets.

Another potential problem with using a [flatbed scanner](#) is if your scanner lid hinges on the long side then the lid will get in the way, unless the lid can be detached.

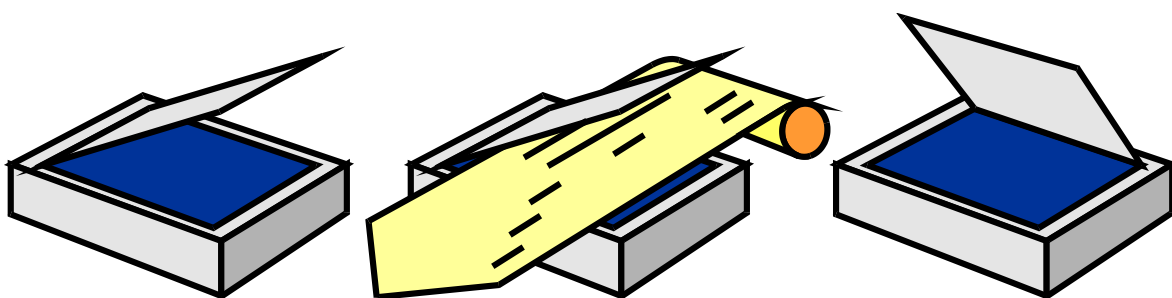


Figure 7 – Different hinge arrangements of flatbed scanners.

The left-hand image above shows a flatbed scanner with the lid hinging on the short side (the “top” of a [portrait A4](#) sheet of paper). The centre image shows how to position the pianola roll on this type of flatbed scanner.

The right-hand image shows a flatbed scanner with the lid hinging on the long side (the “side” of a [portrait A4](#) sheet of paper). It is not possible to place the pianola roll in a similar manner on this flatbed scanner (unless the scanner is an [A3](#) sized flatbed scanner in which case the pianola roll can be placed in line with the hinge).

If your [flatbed scanner](#) lid hinges on the long side then there are a number of ways to get round this.

1. You could find a friend with a scanner with the hinge on the correct side, and ask to borrow it from them.
2. You could scan the pianola roll in two halves with the edge of the pianola roll in line with the lid hinge.
3. You could photocopy your pianola roll and scan the printed sheets.

If you are using a handheld scanner then you need to ensure that you maintain a straight scan and constant scanning speed. Otherwise it will be difficult to align the [note holes](#) between adjacent images, and if the scanning is not at a constant speed then the lengths of the [holes](#) will vary, leading to uneven speeds when playing the final music.

Using a photocopier

As explained above, a photocopier can be useful for getting round various problems with using a scanner to transfer your physical [pianola roll](#) to a [virtual pianola roll](#).

Another advantage of photographing or scanning prints that have been created using a photocopier is that you can write on these prints before photographing or scanning them.

This can be useful to help you identify significant locations on your pianola roll as sometimes it can get confusing which image is adjacent to which image, particularly if the music contains lots of long chords or repeated phrases.

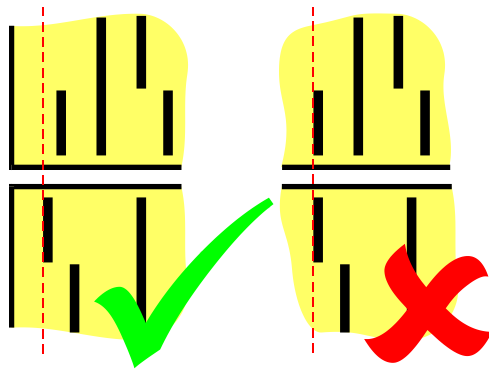
It is never advisable to write on an original pianola roll as they tend to be very old and easily damaged. Therefore writing on photocopy prints is a good alternative.

Useful Tips

To help you create a [virtual pianola roll](#) that is easy to use there are a number of useful tips you should follow.

1. If possible include both edges of the [pianola roll](#) in your photographed or scanned image. This will make it easier for you to align the note guides between the [note holes](#) on the pianola roll (see ["Aligning Roll Edges"](#))
2. If it is not possible to photograph or scan both edges of the pianola roll, try to include at least one edge as this will help ensure the note holes line up between adjacent photographed or scanned images.

In the figure below the left-hand image shows the correct alignment because the edge was included. The right-hand image shows the same notes, but the edge was not included. An assumption was made about two notes being in line but they were not.

**Figure 8**

Showing possible mis-alignment if the edge of the roll is not included.

3. Try to maintain an overlap between adjacent images of about 2.5cm or 1 inch. This makes it easier to align adjacent images because notes within the overlap can be matched.

If the pianola roll contains lots of long repeated chords then you might need to increase the overlap to include the [start](#) or [stop](#) of one or more chords to enable you to align adjacent images correctly.

If all else fails you could make one or two marks on the [pianola roll](#) (ideally a photocopy of the pianola roll – see [“Using a Photocopier”](#) above) and use these marks to align the adjacent images. Marks could be a lightly pencilled cross, a short section of sticky tape, or even a paper clip.

However, don't include too much of an overlap as that will just mean you create more images than necessary.

4. If your photographed or scanned image is the wrong orientation (e.g. [landscape](#)) use some photo-editing software to rotate it to the correct orientation (e.g. [portrait](#)). This also applies if the image isn't straight and requires some minor rotation.

Pianola to MIDI Version 2 does not include any image editing functions as there are lots of programs freely available which do this.

5. When you photograph or scan your [pianola roll](#) place some black card or paper behind the pianola roll to make the [note holes](#) appear black.

You might also consider adjusting the contrast or colour balance of your photographed or scanned images to make it easier to determine where the note holes start and stop. This can be done using some photo-editing software. **Pianola to MIDI Version 2** does not include any photo editing tools.

6. Aim for a maximum final image size of 800 [pixels](#) by 600 pixels, in either orientation, for each image. Use some photo-editing software to change the overall size of your image. Larger sized images will make **Pianola to MIDI Version 2** operate more slowly on some machines.

For example a 28.6cm (11.26 inches) wide pianola roll equates to less than 600 pixels wide at a [resolution](#) of 50 DPI (dots per inch). Therefore if the lowest resolution on your scanner is 150 DPI you will need to reduce the size of the scanned image to 33% of the original size. This would produce [portrait](#) orientation images 600 pixels wide.

If your digital camera at its lowest setting creates an image of 2048 by 1536 [pixels](#) (3 [megapixels](#)) then you need to reduce it using a factor of 39% of the original size. This would produce [landscape](#) orientation images 800 pixels wide by 600 pixels tall.

600 pixels wide is also useful on 1280 by 1024 pixel computer screens as you can [zoom](#) in by a factor of 2 and still see the whole width of the [virtual pianola roll](#) on your screen (assuming the **Pianola to MIDI Version 2** window is maximised).

When using "Pianola To MIDI Version1" to create [".PIO"](#) files in 2004 a resized image size of 640 by 480 pixels was used and it worked fine except occasionally when the [note holes](#) were very short.

The sample **Pianola to MIDI Version 2** data file uses images which are 600 pixels wide by 800 pixels high, the equivalent of scanning a typical pianola roll at 50 DPI (see ["Sample Pianola to MIDI Version 2 File"](#)).

7. Use filenames for the images which make it easier to put the images in the correct order. Don't rely on the filename automatically created by your digital camera or [scanner](#).

A suggested numbering scheme could be to start the numbering at "ABC**01**", then "ABC**02**", "ABC**03**" etc. rather than 1, 2, 3 to avoid Windows Explorer placing image 2 between image 19 and image 20 when ordered alphabetically. Use "ABC**001**" if you think you will have more than 99 images. (*Note: here ABC represents any text, such as the music title.*)

If you are using left half and right half scanned images because the pianola roll is too wide for your scanner (see ["Using a Scanner"](#) above) use a numbering system such as "ABC**01L**", "ABC**01R**", "ABC**02L**", "ABC**02R**", "ABC**03L**", "ABC**03R**" etc. This will help reduce confusion.

8. Once you have photographed or scanned a couple of images try using these images with **Pianola to MIDI Version 2** to check that these images are suitable for your computer and for your requirements.

It would be better to discover you need to change your images at this early stage, rather than after you have photographed or scanned 40 or 50 images.

Step 2. Organise the photographed or scanned images

Now that you have converted your pianola roll into images you can start using **Pianola to MIDI Version 2**. However, before you organise your images you need to follow a few preliminary steps.

Welcome message

1. When you start **Pianola to MIDI Version 2** you will see the following welcome message [dialog box](#). Please read its contents. You need to click on "Accept" in order to use the program.



Figure 9 – Welcome message

This message is not intended to alarm the user. The program has been tested in order to reduce the likelihood of your computer malfunctioning while using the program. However, it is not possible to eliminate all risks. Therefore the above message exists to protect anyone involved with the creation of the program against claims of damage to or corruption of computer equipment.

2. If you are starting the conversion of a new pianola roll click on "File" in the menu bar and then select "New". This will take you through the necessary steps to enter the data required before you can organise your photographed or scanned images.

These steps are described in the following paragraphs.

Entering pianola roll details

- The first [dialog box](#) that will appear enables you to enter the physical characteristics of the [pianola roll](#).

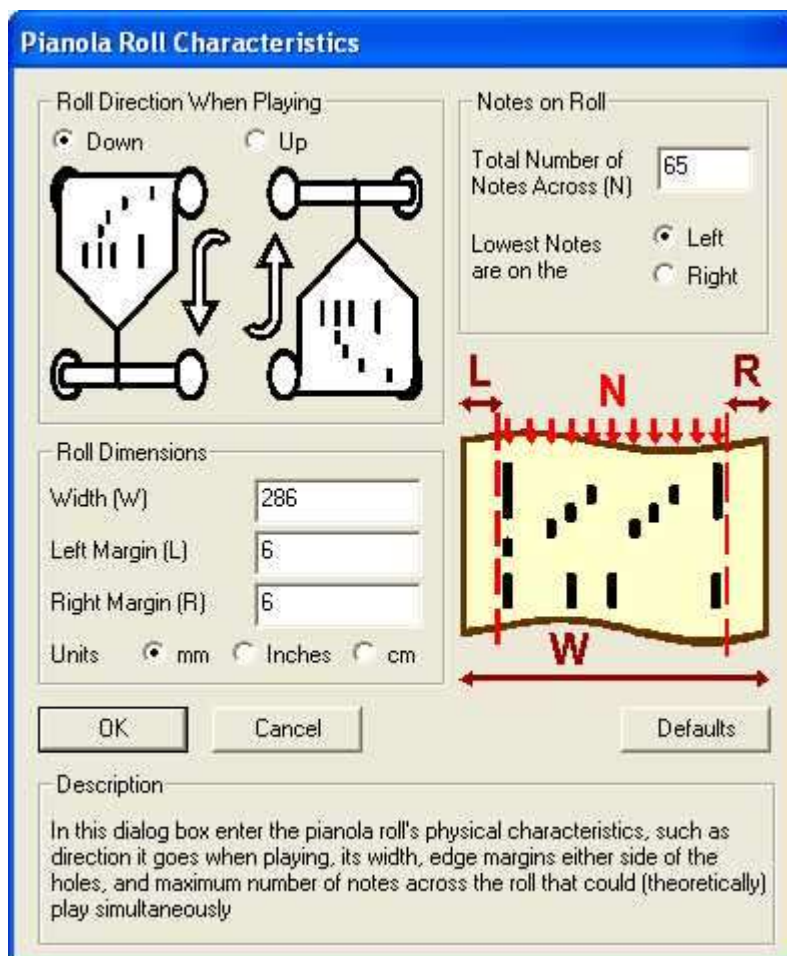


Figure 10 – Entering pianola roll details

- First you must select the direction that the pianola roll goes when you play it using a [pianola](#).

If, when playing your pianola roll on your pianola, you load it above the pianola's [tracker bar](#) and it then travels downwards collecting on a lower spindle while playing, then this is **"Down"**.

If you load it below the pianola's [tracker bar](#) and it travels upwards collecting on the upper spindle then this is **"Up"**.

Confusingly, music on *"down"* pianola rolls starts at the bottom and works its way upwards. Music on *"up"* pianola rolls starts at the top and works its way down.

The default direction is *"down"*.

- Next you need to measure the width and edge margins of your pianola roll. The diagram on the dialog box helps identify how to measure these pianola roll dimensions.

- (iii) Next you need to enter the maximum range of notes that the pianola roll contains. This ought to be the same as the number of holes in the pianola's [tracker bar](#). Often this will be written on the outside of the pianola roll – for example a [65-note pianola roll](#) has a range of 65 notes.
- (iv) Finally, you can also select whether the low notes are to the left-hand side of the pianola roll (the default situation) or to the right-hand side.

If you click on the “Defaults” button the dialog box reverts to the default values in the figure above. If you click on “Cancel” any changes you have made will be lost.

Click on “OK” to pass on to the next dialog box.

Entering music details

- 4. The next [dialog box](#) to appear enables you to enter information about the music, such as what instrument to play, and the music's title and composer's name.

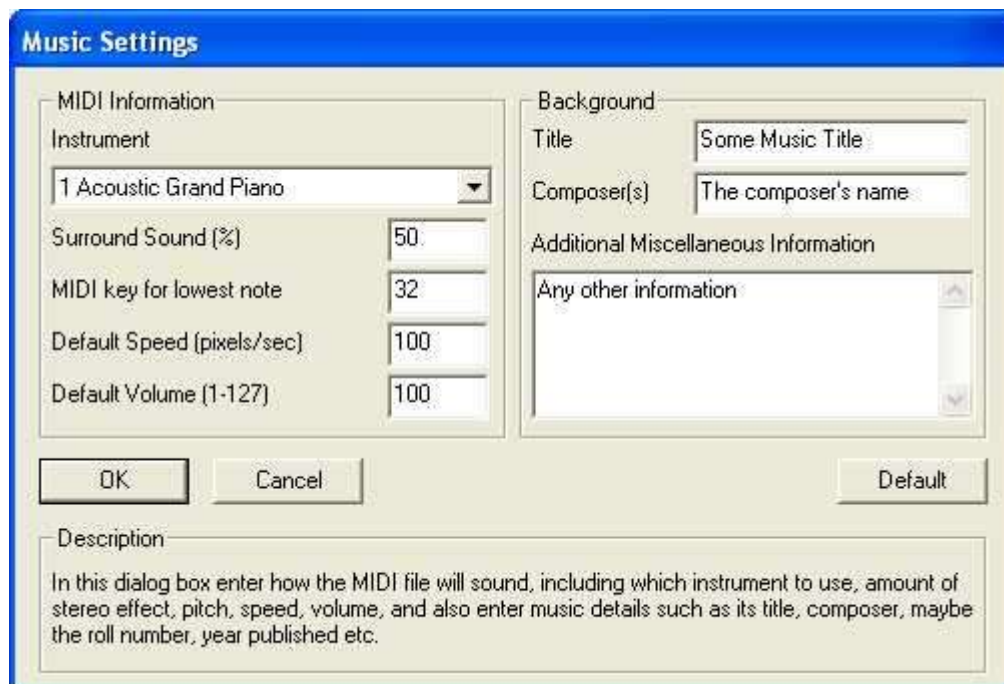


Figure 11 – Entering music details

- (i) You can select from the standard 128 [MIDI](#) instruments.
- (ii) The **surround sound** value affects whether the final MIDI file is in stereo with the lowest notes on the left-hand speaker and the highest notes on the right-hand speaker. A surround sound value of 0% will mean the MIDI file's output is not in stereo.

0% means that all the music is played on one MIDI channel. This will create smaller MIDI files.

100% means that the notes are spread evenly over 15 MIDI channels (this does not include the percussion channel) and this will create larger MIDI files.

Values less than 100% mean the notes are spread over fewer MIDI channels with less of a stereo effect.

- (iii) The **MIDI key for lowest note** value affects the pitch of the final music. The lower the value the lower the pitch. For a [65-note pianola roll](#) 32 is the default value and this equates to the third G# below middle C.

Be aware that MIDI can only play notes in the range 0 to 127. If you enter a value for the lowest note that results in the highest note having a value greater than 127 then the program will inform you of this potential problem. Any notes with a value greater than 127 will not be included in the final MIDI file.

- (iv) The **default speed** refers to the base speed the program uses for your music before varying the speed according to your [speed trace](#) settings.

The default speed is measured in pixels per second. If you know the DPI (dots per inch) settings of your scanned image you can easily convert pixels per second to a more meaningful inches per second or centimetres per second.

For example if an image is scanned at 50 DPI then 100 pixels per second equates to a speed of 2 inches per second (approximately 5 centimetres per second). This is a moderate speed and can be measured when playing your pianola roll on your pianola.

- (v) The **default volume** refers to the base volume the program uses for your music before varying the volume according to your [volume trace](#) settings.

The maximum possible note volume value in a MIDI file is 127. Therefore if you set your default volume to 127 any volume increase via the volume trace will be ignored. Therefore it is best to set the default volume below 127.

- (vi) Finally you have the option of entering three items of text: the **title** of the music, the name(s) of the **composer(s)** and an additional text box for any other **miscellaneous information**.

An example of miscellaneous information might be for a pianola roll that contains a compilation of tunes. In this situation you might wish to enter the title of each tune included in the compilation.

These three text boxes can be left empty.

If you click on the “Defaults” button the dialog box reverts to the default values in the “MIDI Information” rectangle in the figure above. The text is not affected if you click on “Defaults”. If you click on “Cancel” any changes you have made will be lost.

Click on “OK” to pass on to the next dialog box.

Selecting multiple images to attach to virtual pianola roll

5. The next [dialog box](#) to appear is the standard Windows “*get filename*” dialog box. In this dialog box select all the image files that you have created in the previous [“Step 1. Photograph or scan the pianola roll”](#) section.
6. The next dialog box to appear enables you to confirm the order of the images. This dialog box exists because often when selecting multiple filenames Windows will change the order of the filenames selected.



Figure 12
Confirming images order

As shown in the figure above, a common order change is to place the last filename at the top of the list. If this occurs select the filename and click on “Move to End” to move it to the end of the list.

If you click on “Cancel” then the images will not be attached to the program’s [virtual pianola roll](#).

Click on “OK” to attach these images to the program’s virtual pianola roll.

Note that you can revisit and change the values in all the above dialog boxes by selecting “File” on the program’s menu bar and then clicking on an item that appears below it.

Program’s main window

7. You should now see the program’s main window as shown in the figure below. The program’s main window consists of two principal parts:
 - (i) To the left is the [“overview window”](#).
 - (ii) To the right is the [“detail window”](#).

The overview window shows the whole [virtual pianola roll](#) as a series of rectangles (white by default). Each rectangle represents a single attached image. The overview window also shows the current position of the detail window with a rectangle (red by default) relative to the virtual pianola roll.

The purpose of the overview window is to help you navigate through the virtual pianola roll.

You can hide and re-show the overview window by pressing “Control” and “W” at the same time, or by selecting “View” in the menu bar and then clicking on “Overview Window”. Hiding the overview window makes the detail window wider which can be useful if you have [zoomed](#) in.

The detail window is where you carry out most of the program's functions including rearranging the attached images.

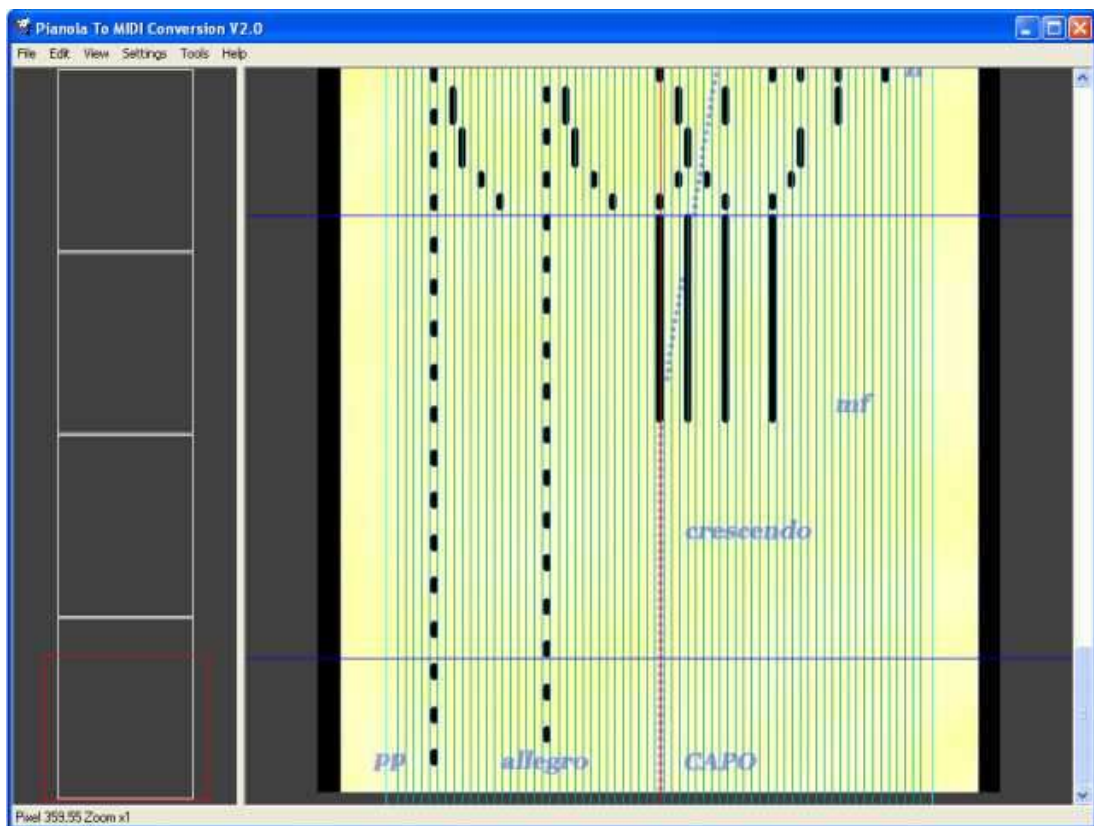


Figure 13 – Program's main window

Changing the positions of attached images

To change the position of an attached image you need to move the mouse cursor over the image. When the cursor changes to a hand click and hold the left mouse button and drag the image to its new position.

You will note that the hand does not appear when the cursor is among the blue vertical lines in the figure above, or over the blue horizontal lines or over the red vertical line. These lines are various program components which will be explained later. At this stage you can make all these components disappear by pressing the numerical keys – in this case “2”, “3”, “4”, “7” and

“8”. You should then be able to move an image by clicking anywhere on the image.

When the image you are dragging overlaps an adjacent image you will note that the program switches between the two images. This is to help you position the images more accurately. The program will only switch between the two images while one of the images is being repositioned.

While repositioning an attached image, if you move the mouse cursor off the edge of the detail window the program automatically scrolls the window in that direction. To keep scrolling you need to keep moving the mouse. The further away the mouse is from the edge of the detail window the faster the scroll.

You can also [zoom](#) in by pressing the keys “Control” and “I” at the same time. This will enable you to see more accurately the relative position of two adjacent images.

If the overview window is activated it will show the changing position of the image you are dragging as you drag it.

There is no “undo” function for image positioning.

Changing the order in which attached images are drawn

If you want to change the order in which the images are drawn (i.e. which image appears on top of which image) you can do this via the “Pianola Roll Images” [dialog box](#) shown in the figure below.

To activate this dialog box select “File” in the menu bar and then click on “Images...”

The image at the top of the list is drawn first, the second image second, and so on until the image at the bottom of the list which is drawn last.

This dialog box also enables you to remove images and add further images. Note that all images need to be stored in the same folder for the program to function correctly. If you try to add images from different folders the program will advise you that this is not possible.

The images also need to be available while the program is running as the program loads the images as and when they need to be displayed.

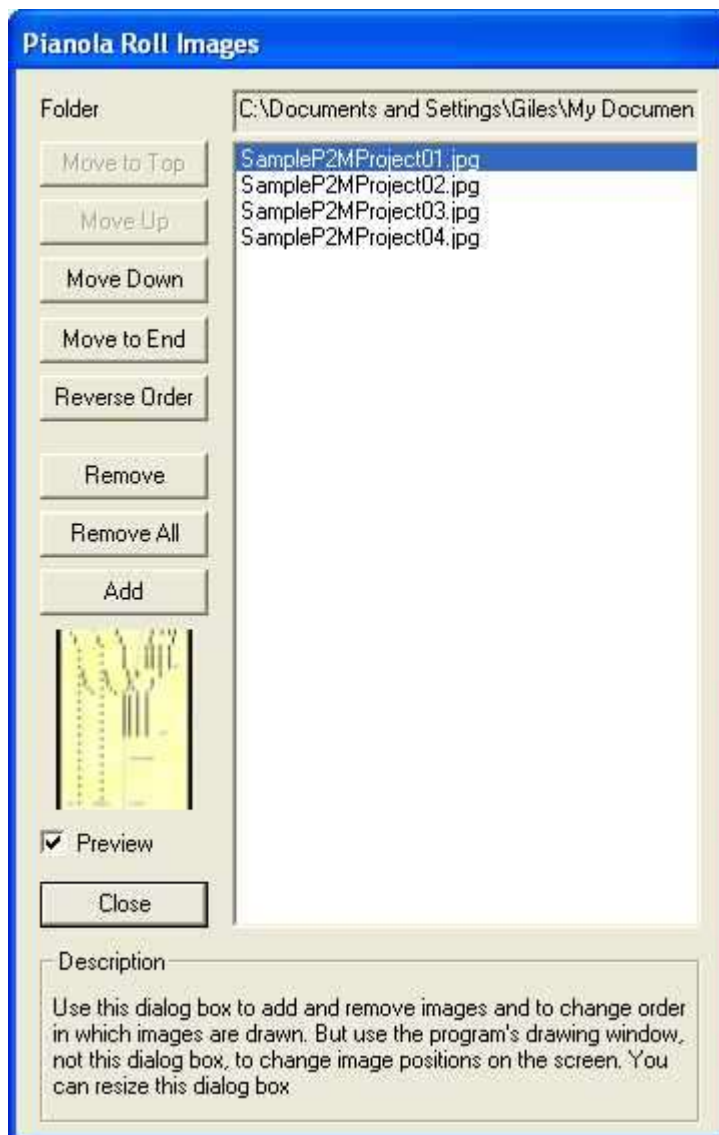


Figure 14
Roll images dialog box

Aligning roll edges

- Finally you need to align the program's [roll edge](#) components to your [virtual pianola roll](#).

If you switched off various program components while positioning the attached images (see [“Changing the positions of attached images”](#)) you can switch these components back on by pressing the numerical keys again.

To redisplay the roll edge components press “2” and two vertical lines (cyan by default) should appear.

If you are unsure which lines are the program's [roll edge](#) components you can repeatedly press “2” and the lines which keep appearing and disappearing are the program's roll edge components.

You need to move each roll edge component so that it lines up with the roll edge of your photographed or scanned images that form the program's [virtual pianola roll](#).

To move a roll edge you need to move the mouse cursor over the roll edge. Then the cursor should change to a two-headed arrow image with the arrows pointing left and right. Then click and hold the left mouse button and drag the vertical line to its new position.

If you are displaying the [note guides](#) component (the dark cyan vertical bars between each roll edge) you should see them align between the [note holes](#) on the virtual pianola roll, assuming the data entered for the pianola roll dimensions is correct. To redisplay the note guides component press “3”.

After you have finalised the roll edge positions you might also wish to double check the positions of the attached images, adjusting them slightly left and right if they do not match the final roll edge positions.

Step 3. Mark the start and end of each note

You can now mark the [start](#) and end (or [stop](#)) of each note on the [virtual pianola roll](#).

Note that if you switched off various program components while positioning the attached images (see [“Changing the positions of attached images”](#)) you can switch these components back on by pressing the numerical keys again. Alternatively you can check which components are being displayed by clicking on “View” in the menu bar. In order to add [note starts and stops](#) you need to ensure that at least “Note Guides” (numerical key “3”) and “Note Start/Stops” (numerical key “5”) are ticked.

Marking the note starts and stops

When marking [note starts and stops](#) the cursor should be the standard angled Windows arrow. If it is not then you need to check that the correct program components are being displayed (as described in the previous paragraph).

- **To mark a note start** you need to position the cursor over the start of the [note hole](#) on your [virtual pianola roll](#) and click the left mouse button. A small rectangle (green by default) should appear.
- **To mark a note stop** you need to position the cursor over the end of the note hole on your virtual pianola roll and press and hold down the “Control” key at the same time as clicking the left mouse button. A small rectangle (red by default) should appear.

For “down” pianola rolls the [note start](#) is at the bottom of the [note hole](#) on your virtual pianola roll and the note end or stop is at the top of the note hole. For “up” pianola rolls the note start is at the top and the [note stop](#) is at the bottom. This is displayed in the figure below. (Refer to [“Entering pianola roll details”](#) for an explanation of “down” and “up” pianola rolls.)

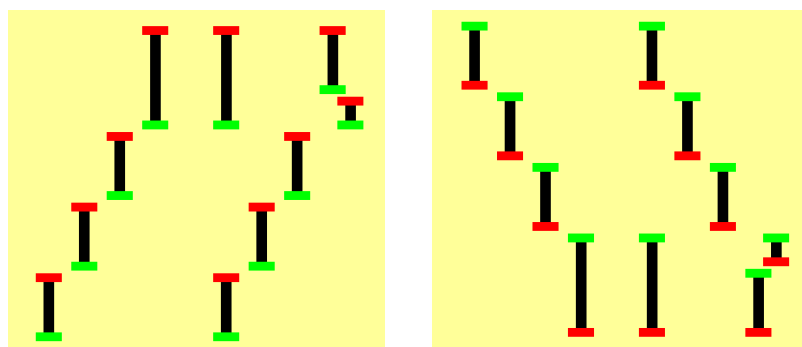


Figure 15
Showing [note starts and stops](#)

The left hand figure is for “down” pianola rolls. The right hand figure is for “up” pianola rolls. Each figure shows the same set of notes.

If grey vertical bars ([note bars](#)) appear you can hide them by pressing “6” or selecting “View” from the menu bar and clicking on “Note Bars”. These vertical bars are a useful tool when checking note start/stop pairs but can be confusing when initially marking note starts and stops. By default note bars are not displayed.

Tools to help make it easier to mark note starts and stops

There are a number of tools available to help make it easier to mark [note starts and stops](#).

Changing program colours

1. You can change the colours of the various program components by selecting "Settings" on the menu bar and clicking on "Colours...". The [dialog box](#) in the figure below will appear.

If you click on any of the coloured buttons this will bring up the standard Windows "select a colour" dialog box which will enable you to change that component's colour.

If you click on any of the ticks this will hide or re-show the item on the example program output included within the dialog box. Clicking on "Show None" will remove all the ticks. Clicking again on "Show None" (which will have changed to "Show All") restores all the ticks.

If you click on the "Defaults" button the dialog box reverts to the default colours in the figure below. If you click on "Cancel" any changes you have made will be lost.

If you click on "OK" the changes will be kept. These colours will be saved with your Pianola-To-MIDI data file but they will not become the default colours the next time you start the program.

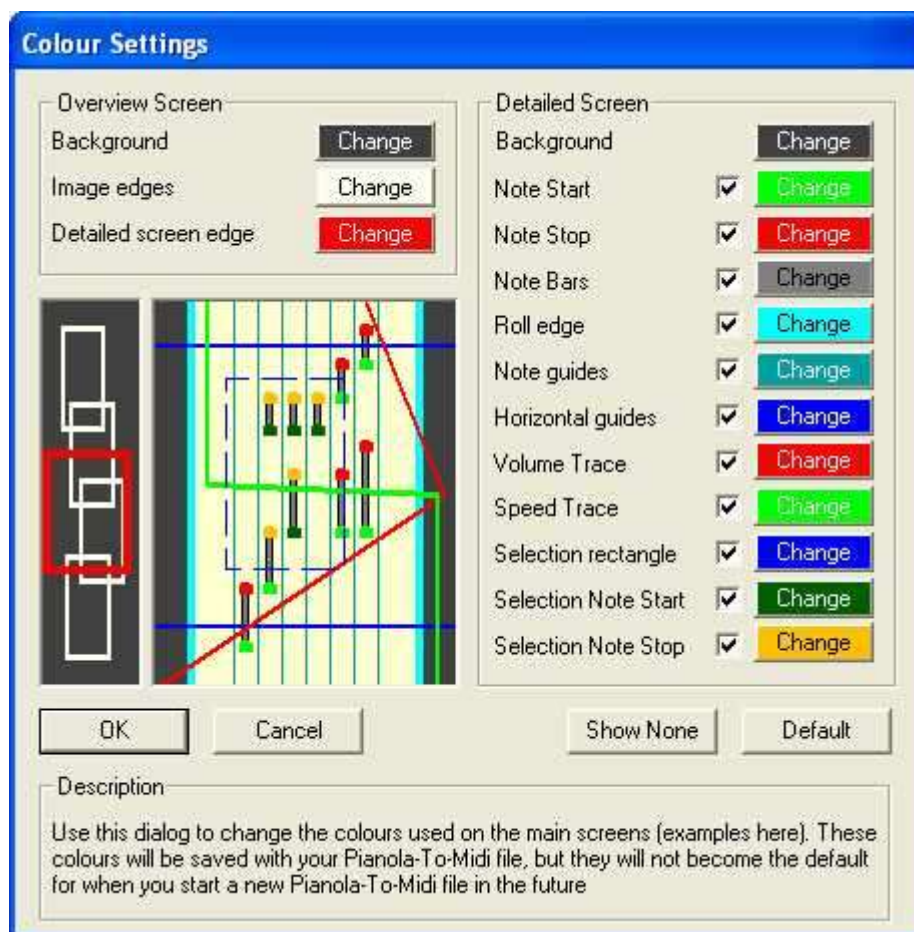


Figure 16 – Changing program colours

There is no "undo" facility for restoring colours prior to any changes made.

Changing detail window zoom factor

2. You can **zoom in and out** of the detail window. The maximum zoom in factor is 6 times the original size. The minimum zoom out factor is 1 times the original size.

There are a number of methods to [zoom](#) in and out.

- (i) You can press “Control” and “I” at the same time to zoom in or “Control” and “O” to zoom out. This centres the zoom on the centre of the [detail window](#), unless at the edge of the virtual pianola roll.
- (ii) You can select “View” from the menu bar and then click on either “Zoom In” or “Zoom Out”. This also centres the zoom on the centre of the detail window as above.
- (iii) You can click on the right mouse button while the cursor is within the detail window. A small menu will pop up and you need to click on “Zoom In” or “Zoom Out”. This will centre the zoom on your current mouse cursor position.

You can check the current zoom by looking at the bottom of the program window while moving your mouse. Unless you are changing a program component (such as repositioning an image) here it will show the current mouse coordinates followed by the text “Zoom xN” where N is the current zoom.

Horizontal guide lines

3. The program provides two **horizontal guide lines** (dark blue by default) which are there to help you line up your [note starts or note stops](#) at the same vertical coordinate on the screen.

To change the position of the horizontal guide lines you need to position the mouse cursor over the line you wish to move. The cursor will change to a two-headed arrow with the arrows pointing up and down. Press and hold the left mouse button and drag the guide line to its new position.

Horizontal guide lines are not stored with your saved Pianola-To-MIDI data file.

To hide or re-show horizontal guide lines you can either press “4” or select “View” from the menu bar and click on “Horizontal Guides”.

Selecting notes or groups of notes

4. You can **select individual or groups of notes** starts and stops in order to alter the notes in some way.
 - To select a single [note start or stop](#) you need to position the mouse cursor over the note start or stop and click the left mouse button.
 - To select a group of note starts or stops you need to draw a [selection rectangle](#) around the group of note starts or stops. To do this you first position the mouse cursor to one corner of the rectangle. Click and hold

the left mouse button and then drag the mouse cursor to the opposite corner.

When you release the left mouse button any note starts or stops entirely within the rectangle will be selected. Note starts or stops that are only partially within the rectangle will not be selected.

By default, any previously selected [note starts or stops](#) are deselected when you select a single or group of note starts or stops. However, if you don't want this to happen you need to press and hold down the "Shift" key when you click on the left mouse button. This enables you to add more note starts or stops to an existing selection.

You can **select all** the note starts and stops by pressing "Control" and "A" at the same time, or by selecting "Edit" in the menu bar and then clicking on "Select All".

You can **deselect all** the note starts and stops by selecting "Edit" in the menu bar and then clicking on "Select None". Another way to deselect all note starts and stops is to draw a [selection rectangle](#) that contains no note starts or stops.

You can also **swap** the selected [note starts and stops](#) with the unselected note starts and stops by pressing "Control" and "R" at the same time, or by selecting "Edit" in the menu bar and clicking on "Reverse Selection".

Showing data statistics

Data Statistics	
Selected Notes	
Total Starts	0
Total Stops	0
From, To (pixels)	0, 0
Pianola Roll Images	
Total Images	4
Overall Width (pixels)	600
Overall Height (pixels)	3051
Non-Selected Notes	
Total Starts	364
Total Stops	364
From, To (pixels)	29, 3046
Volume Trace	
Total Nodes	9
From, To (pixels)	17, 2927
Speed Trace	
Total Nodes	9
From, To (pixels)	342, 2908
Notes On Clipboard	
Total Starts	0
Total Stops	0
From, To (pixels)	0, 0
Changed Since Last Save <input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> Show This Dialog Box After Each Selection Rectangle	
<input type="button" value="Close"/>	

Figure 17 – Showing data statistics

If you have selected a group of [note starts or stops](#) using a [selection rectangle](#) the **statistics dialog box** in the figure above will automatically appear. This allows you to confirm how many note starts or stops are selected.

This [dialog box](#) also shows information about note starts or stops which have been cut or copied to the [clipboard](#), it shows information about the attached images, and it also shows data about the volume and speed [traces](#). The “From, To (pixels)” in the dialog box above refers to the range of vertical coordinates for that group of data.

You can stop the statistics dialog box from appearing automatically by unticking the box labelled “Show this dialog box after each selection rectangle”. This box is ticked by default each time you start **Pianola to MIDI Version 2**.

You can display the statistics dialog box at any time by selecting “Tools” in the menu bar and then clicking on “Statistics...” or by pressing “Control” and “T” at the same time.

Actions to selected notes or groups of notes

5. When you have selected a single or a group of [note starts or stops](#) there are a number of things you can do to them.

- (i) You can **cut** them to the program's [clipboard](#) by pressing “Control” and “X” at the same time, or by selecting “Edit” in the menu bar and then clicking on “Cut”.

This removes the selected note starts or stops from the detail window but stores them in the program's memory so that you can restore them in same position at a later time.

Any note starts or stops already in the program's clipboard are lost when you carry out this action.

- (ii) You can **copy** them to the program's [clipboard](#) by pressing “Control” and “C” at the same time, or by selecting “Edit” in the menu bar and then clicking on “Copy”.

This is similar to “Cut” in that it stores a copy of the selected note starts or stops in the program's memory. However, the notes also remain within the detail window.

Any note starts or stops already in the program's clipboard are lost when you carry out this action.

- (iii) You can **delete** them by pressing the “Delete” key or by selecting “Edit” in the menu bar and then clicking on “Delete”.
- (iv) You can also **swap the start or stop value** of each note. To do this you can either press “Control” and “P” at the same time or select “Edit” in the menu bar and then click on “Swap Start/Stop”.

This means that all selected note starts will become note stops and all selected note stops will become note starts. This can be useful if you have accidentally marked some note starts as stops or vice-versa.

- (v) You can **move** the selected notes to different columns or to different vertical positions along the virtual pianola roll.

This can be done by either clicking and holding the left mouse button on one of the selected note starts or stops and dragging the notes to a new position.

Or you can use the four cursor keys and the “Page Up” and “Page Down” keys to move the selected note starts or stops. The cursor keys move the note starts or stops one column left or right or one pixel up or down at a time. The “Page up” and “Page Down” keys move the selected notes 10 pixels at a time up or down the screen.

Note that the program will not permit you to move note starts or stops off the edge of the [virtual pianola roll](#).

- (vi) When you have “cut” or “copied” some [note starts or stops](#) on to the program’s [clipboard](#) you can **paste** them back into the detail window by pressing “Control” and “V” at the same time, or by selecting “Edit” in the menu bar and then clicking on “Paste”.

By using “copy” and “paste” you can quickly enter groups of note starts and stops that are repeated through the music, for example repeated chords or whole sections of music.

- To do this you would “copy” the note starts and stops to the program’s clipboard.
- Next you would move the still selected note starts or stops to their second, repeated position.
- Finally you would “paste” the original notes back into their original position.

Thus you would have quickly marked two copies of the same group of note starts or stops on your virtual pianola roll.

This process can also be used for building up a chord of notes. You define the first note of the chord and then “copy”, move (typically using the left and right cursor keys), and “paste” repeatedly until the whole chord is created.

Undo actions to selected notes or groups of notes

6. **Pianola to MIDI Version 2** contains a limited “undo” facility. You can **undo** only the previous “cut”, “copy”, “paste”, and “delete” action by either pressing “Control” and “Z” at the same time, or by selecting “Edit” from the menu bar and then clicking on the top item in the drop down menu. The item text will change depending on what action can be undone.

You can also undo “move” actions but the program will go back to the first of a group of “move” actions, which may not be the same as the last “move” action.

Once you have undone an action you can **redo** it by pressing “Control” and “Z” at the same time again, or by the same menu bar process. You can then undo the redo and redo the undo repeatedly. This enables you to flip back and forth between two data situations.

Any undo data is lost when you save your data or exit the program.

Showing or hiding vertical note bars

7. Once you have entered a number of [note starts and stops](#) you can quickly check that they are correct by displaying the **vertical note bar** components in the detail window. To do this you press “6” or you select “View” in the menu bar and then click on “Note Bars”. [Note bars](#) are grey by default.

The note bars should be located over the [note holes](#) on your [virtual pianola roll](#). If they do not then this indicates that some incorrectly marked note starts or stops have been entered.

Identifying any unpaired or “orphaned” note starts or stops

8. To help you identify any lone, unpaired or “orphaned” [note starts or stops](#) (i.e. starts or stops that are not part of a start/stop pair) **Pianola to MIDI Version 2** contains the “Checking Note Start/Stop Pairs” [dialog box](#) in the figure below.

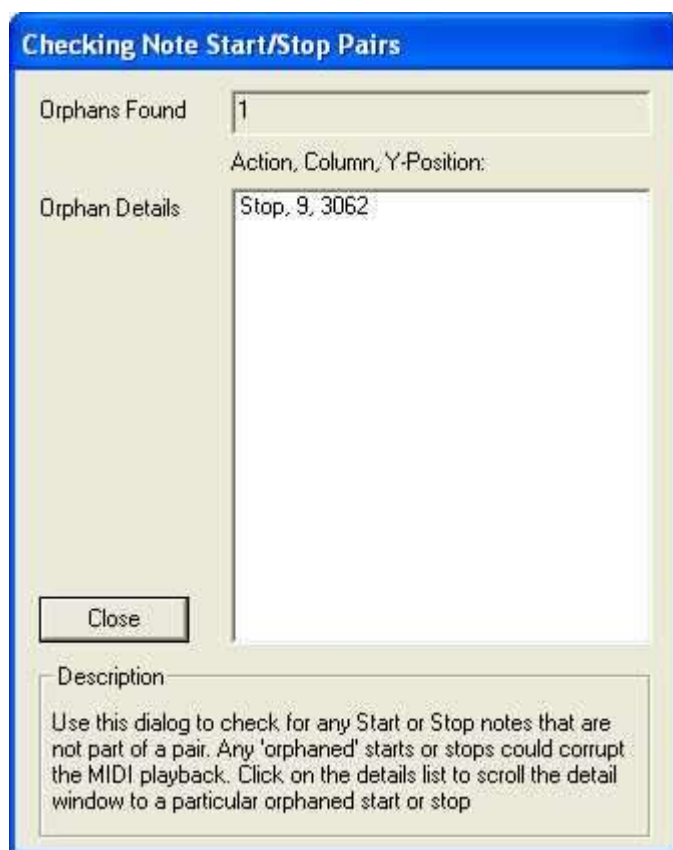


Figure 18

Checking for unpaired or “orphaned” [note starts or stops](#)

This file contains just one unpaired note stop. It is in the 9th column from the left and it has a vertical coordinate of 3062 pixels.

To activate this dialog box you need to select “Tools” in the menu bar and then click on “Check Start/Stop Pairs”.

If the program identifies any unpaired note starts or stops it will list them in the dialog box. If you click on an item in the list then the program automatically scrolls the [detail window](#) to show that note start or stop.

All unpaired note starts or stops identified become selected note starts or stops. All other note starts and stops would not be selected.

It is important to identify unwanted unpaired note starts or stops because they can affect the final [MIDI](#) file created. For example an unpaired note start near the beginning of the music could play continuously throughout the music (depending on the instrument), thus ruining the music.

However, an unpaired note stop at the end of the music can be useful in delaying the stop of MIDI playback. This can be necessary because some MIDI player software or hardware can sound a loud click at the end of playing the MIDI file because the program closes down too quickly for the music. The same can sometimes apply at the start of the music.

Step 4. Adjust speed and volume

Once you have entered all the [note starts and stops](#) you can now add some feeling to the music by adjusting the speed and volume of the music at different positions along the [virtual pianola roll](#). This will make the music sound less mechanical.

This is done by using the **speed trace** and **volume trace** components of **Pianola to MIDI Version 2**.

Speed trace and volume trace

Initially these [traces](#) are vertical lines in the centre of the [detail window](#). The speed trace is green by default and the volume trace is red by default. Because initially the two traces are in the same position you will only see the volume trace (a red line) as it is drawn on top of and therefore obscuring the speed trace.

To hide or re-show the volume trace you can press “7”. To hide or re-show the speed trace you can press “8”. Or you can select “View” in the menu bar and then click on either “Volume Trace” or “Speed Trace”. If you wish to see or change the speed trace, but it is obscured by the volume trace, then you need to hide the volume trace and this will reveal the speed trace, unless it is hidden too.

To change either trace move the mouse cursor over the desired trace and the cursor will change to a four-headed arrow symbol with arrows pointing left, right, up and down. Then click and drag the trace to the position you require. You will note that a small square has been added to the trace. This is a node.

Trace nodes

Changes in direction of either [trace](#) are called **nodes** and they are represented on the [detail window](#) by a small square on the trace.

If a trace contains only one node then this defines the position of the trace across the screen, but the trace remains a vertical line.

If a trace contains more than one node then this defines the shape of the trace. Nodes cannot have the same vertical coordinate and the trace cannot go backwards. Where a trace contains a near-horizontal line this represents an abrupt change in speed or volume as shown in the figure below.

To **add more nodes** simply click and hold the left mouse button over the trace and drag the newly created trace node to the desired position.

To **delete a node** move the mouse cursor over the node position and click the right mouse button. A small menu will appear and you need to click on “Delete Node” to delete the node you clicked over. You cannot delete nodes via the menu bar or with keyboard input.

If you wish to **delete all nodes** for a trace you need to move the mouse cursor over the trace (it does not have to be at a node) and click the right mouse button. This time click on “Delete All Nodes” on the small menu that appears. The program will ask for confirmation before deleting all the nodes for that trace.

Note that there is no “undo” facility for traces. Therefore if you move, add or delete a node or delete all the nodes for a trace that action cannot be reversed via an “undo” function.

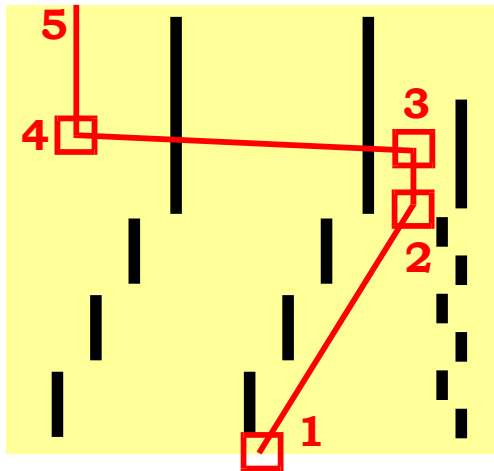


Figure 19

Showing an example volume trace

Assuming the music plays from bottom to top, the volume changes as follows:

- 1 to 2: gradually getting louder
- 2 to 3: constant loud volume
- 3 to 4: sudden drop to quiet volume
- 4 to 5: constant quiet volume

The left/right extent of each [trace](#) is defined by the left most and right most [note guides](#).

Speed and volume factors

The program uses the speed and volume [traces](#) to calculate the time at which to play each [note start and stop](#) and the volume at which to play each note start.

It does this by multiplying the default speed and the default volume (as set in the music dialog box, see [“Entering music details”](#)) by factors calculated using the speed and volume traces. The factors are as follows:

<i>Position of trace</i>	<i>Speed trace</i>	<i>Volume trace</i>
Far left-hand side of virtual pianola roll:	5 times slower	Silent
Centre of pianola roll:	No change	No change
Far right-hand side of virtual pianola roll:	5 times faster	2 times louder

Trace positions in between the positions listed above will give factors between the values given above.

Trace limitations

A limitation exists in that if you define two nodes with vertical coordinates that are far apart (for example one at the bottom of the [virtual pianola roll](#) and the second at the top of the virtual pianola roll) then the program may not allow you to add any further nodes in between them. This is an unfortunate programming limitation.

To get round this limitation it is best to define your nodes at closer intervals (typically every 1000 pixels). Then you will be able to add further nodes in between as you require.

However, if the volume or speed is to remain constant through the music then a single node at the start of the music would be sufficient.

Also you cannot add new nodes to a horizontal or near-horizontal section of a trace. This is because no two nodes can have the same vertical coordinate.

Therefore if two nodes are 1 pixel apart in the vertical direction but far apart in the horizontal direction, it is not possible to add any more nodes between those two nodes because there are no available vertical coordinates between these two nodes.

Check for timing clashes

To help you identify any [note starts or stops](#) that have the same note value and timing **Pianola to MIDI Version 2** contains the “Checking Note Start/Stop Timing” [dialog box](#) in the figure below.

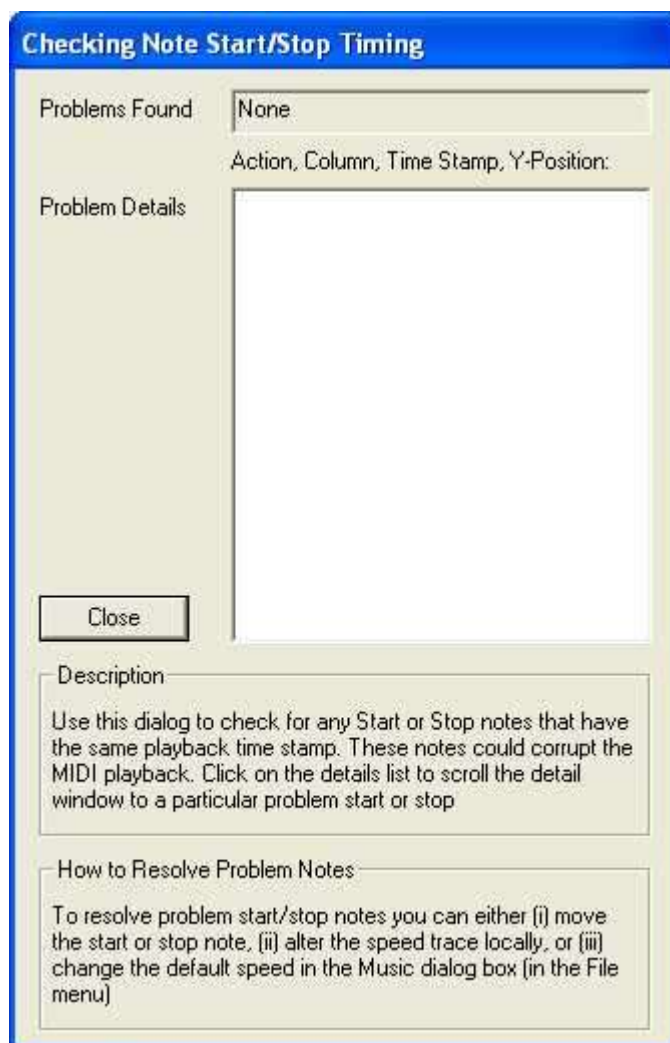


Figure 20

Checking for [note starts and stops](#) that have the same note value and timing.

In this example no note starts and stops contain the same note value and timing.

If there were any data in the “problem details” list then clicking on them would make the detail window automatically scroll to show that note start or stop.

All note starts or stops identified in the list would be set as selected. All other note starts and stops would not be selected.

If note starts and stops have the same note value and timing then the MIDI file may contain unexpected notes or miss out some notes.

This problem occurs when you have a fast default speed and a [speed trace](#) that makes the speed even faster, too fast for **Pianola to MIDI Version 2**'s time resolution which is 5 milliseconds.

To activate this dialog box select “Tools” from the menu bar and then click on “Check Start/Stop Timing”.

Playing music

Once you have marked some or all of your [note starts and stops](#) on the [virtual pianola roll](#) you can play the notes through a [MIDI](#) device using **Pianola to MIDI Version 2**. It also helps to play the music while changing the [speed and volume traces](#) to confirm that you are getting the desired music.

You can play various sections of the music:

- (i) To **play all** the note starts and stops select “Tools” in the menu bar and then click on “Play All”.
- (ii) To **play only selected** note starts and stops select “Tools” in the menu bar and then click on “Play Selection”.
- (iii) To play only the note starts and stops currently **displayed in the detail window** select “Tools” in the menu bar and then click on “Play View”. In fact notes to the left and right of the [detail window](#) will also play, if there are any.
- (iv) You can even play all note starts and stops **backwards** by selecting “Tools” in the menu bar and then clicking on “Play Backwards”. This can be entertaining.

To stop the music playing you can either press “Escape” or you can select “Tools” in the menu bar and then click on “Stop Playing”.

Pianola to MIDI Version 2 uses the Windows Multimedia buffer to play the MIDI data. However, this buffer cannot be bigger than 64 kilobytes. If you try to play music that requires a larger buffer the problem dialog box in the figure below will appear.

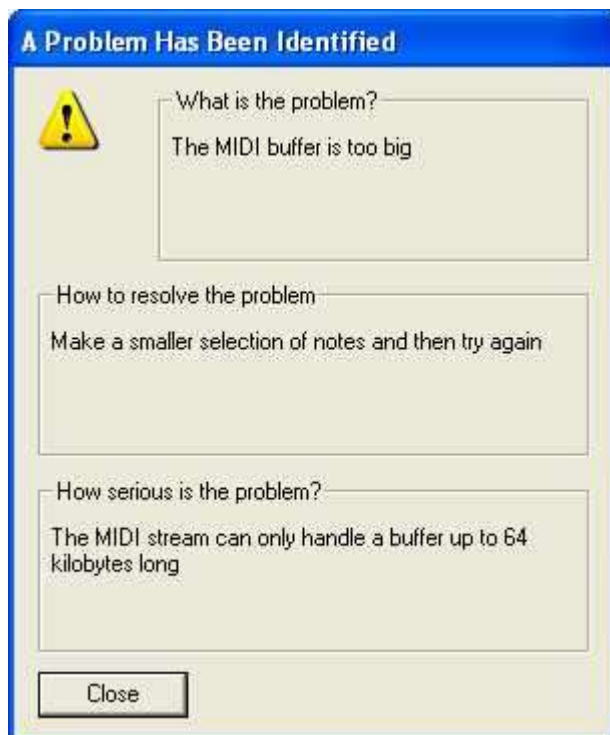


Figure 21

Showing the problem dialog box when the MIDI play buffer is too large.

The top box describes the problem, the middle box advises how to resolve the problem, and the bottom box explains why the problem has occurred, how serious it is or what will happen if you do nothing.

This will occur with some of the larger imported Pianola to MIDI Version 1 [PIO](#) files when you click on “*Play All*” because of their size. It may also occur when you have entered a large number of [note starts and stops](#) on your [virtual pianola roll](#).

To get round this problem you need to select a portion of the music using a [selection rectangle](#) and then select “*Tools*” in the menu bar and then click on “*Play Selection*” as described above. This problem does not affect the exported MIDI data which should play on any MIDI software or hardware irrespective of final file size.

To change which [MIDI](#) output device the program plays the music through, and the device's volume, select “*Settings*” on the menu bar and then click on “*MIDI Output...*” and the dialog box in the figure below will appear.

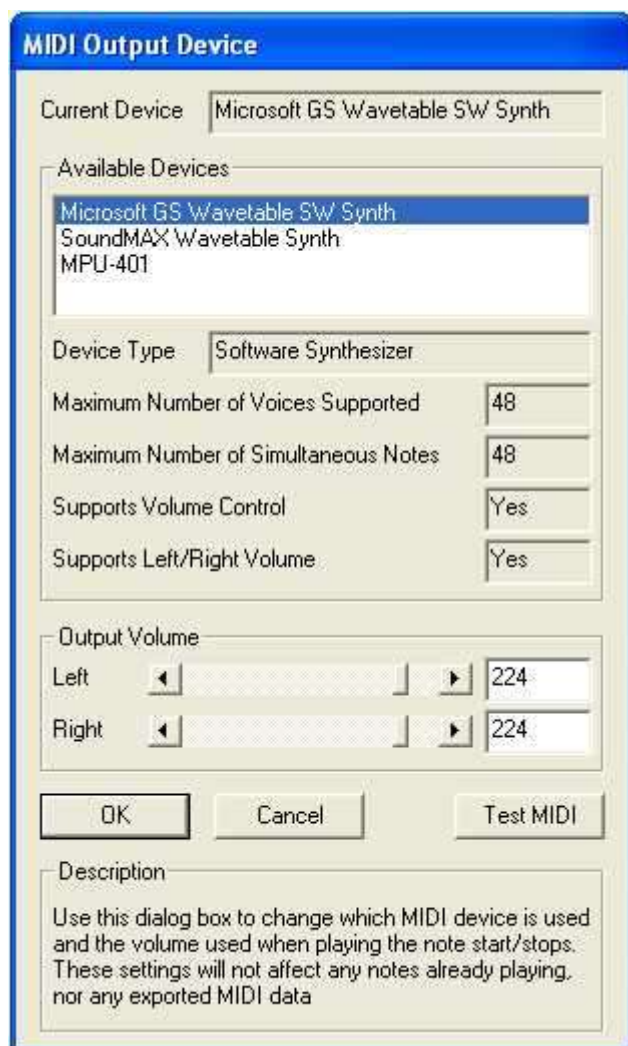


Figure 22

Selecting the [MIDI](#) output device and output device volume.

Clicking on the different available devices will update the information about the device shown below the devices list. Most Windows computers should contain at least the “*Microsoft GS Wavetable SW Synth*” MIDI output device.

If you click on “*Test MIDI*” a piano chord will play. This allows you check that a [MIDI](#) output device is working. For some MIDI devices there might be a short delay before the chord plays. This is because some devices need to load the instrument sounds into their memory before they can be played.

Pianola to MIDI Version 2 does not cache MIDI instruments because most MIDI output devices no longer require this to be done. However, if you select a MIDI output device that requires instrument caching it might not work with this program. This will not affect any MIDI file created by this program which should play using any MIDI output device and the standard Windows Multimedia Player.

To stop the chord playing click on *“Test MIDI”* again (it will have changed to *“Stop MIDI”*).

You can drag either scroll bar or enter values directly to change the output device's volume, or change the balance between left and right speakers. Both volume values should be the same to maintain an even left/right balance.

If you click on *“Cancel”* the changes you have made will be lost. Click on *“OK”* to keep any changes you have made.

When **Pianola to MIDI Version 2** is playing the music via the [MIDI](#) output device you can set the program to scroll the detail window to follow the music. By default this only occurs when you play all the music (forwards or backwards). By default it does not occur when playing selected notes or notes in the current [detail window](#) view.

To change these scrolling options you need to select *“Settings”* in the menu bar and then click on *“Playing Options...”*. The dialog box in the figure below will appear.



Figure 23

Changing options for scrolling the detail window when playing music.

The smaller the step size the smoother the scrolling will appear. However, on some machines too small a step size will result in jerky scrolling as the computer fails to redraw the detail window quickly enough.

Another way to make the scrolling smoother is to hide the attached images by pressing *“I”* or selecting *“View”* in the menu bar and then clicking on *“Images”*. The scrolling will be smoother because drawing the images can take a lot of computing power thus delaying the scrolling. It is worthwhile experimenting to see what suits your computer best.

If you click on *“Cancel”* the changes you have made will be lost. Click on *“OK”* to keep any changes you have made.

Step 5. Export the music as a MIDI file

When you have completed marking the [note starts and stops](#) on the [virtual pianola roll](#), adjusting the speed and volume [traces](#) to your requirements, and playing the music using **Pianola to MIDI Version 2** to check that the music sounds its best, you can now export the music to a [MIDI](#) file for playing on any compatible MIDI software or hardware.

Exporting to a MIDI file

To export your music to a MIDI file you need to select “File” on the menu bar and then click on “Export...”. The standard Windows “get filename” [dialog box](#) will appear enabling you to create a MIDI file in a different folder and with a different filename as you require.

If an error occurs while creating the MIDI file the following dialog box will appear.

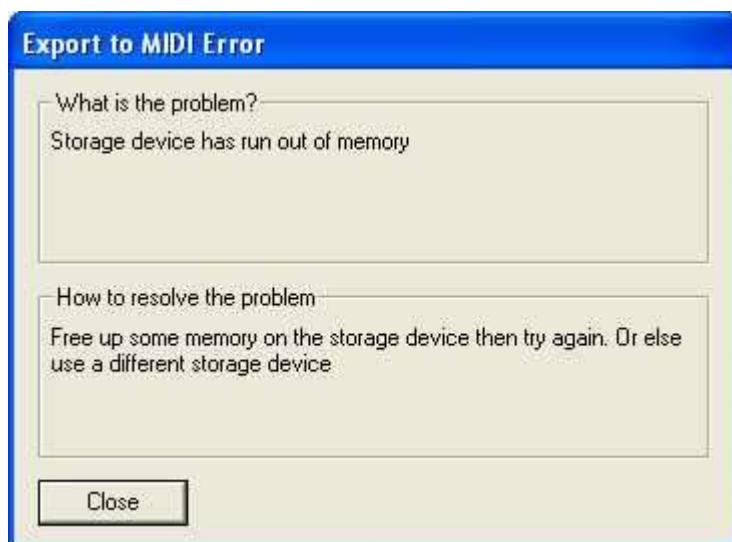


Figure 24

Advising of an error when trying to export to a MIDI file.

In this example the storage device had run out of memory. The dialog box advises what actions to take to try and resolve the error.

If the music is exported successfully you will hear a beep and a confirmation message will appear in the bottom of the program window.

The [MIDI](#) file that is created is a **Format Type 1 MIDI** file containing two simultaneous tracks.

- (i) The first track contains the text information entered in the music [dialog box](#) (see “[Entering music details](#)”), an arbitrary common 4/4 time signature, a tempo of 500 milliseconds per beat and 100 ticks per beat. This equates to 120 beats per minute (BPM) and each tick lasts 5 milliseconds.
- (ii) The second track starts with the instrument definitions and the left/right pan settings for each channel used. Then it contains the note start and stop messages. The [delta time](#) between each [note start and stop](#) is measured in ticks.

Saving your Pianola-To-MIDI data file

As well as exporting your music you can also save your Pianola-To-MIDI data to a file with the extension “[P2M](#)”. This file will contain the following information.

- (i) Pianola roll data (dimensions, total number of note columns etc.)
- (ii) Music information (instrument, volume, speed, title etc.)
- (iii) Filenames for attached images and their positions on the [virtual pianola roll](#).
- (iv) The colour settings used for each component displayed in the [overview window](#) and the [detail window](#).
- (v) The [note starts and stops](#) data.
- (vi) The [volume trace](#) and [speed trace](#) data.

Saving the file allows you to take a break from converting your [pianola roll](#) to [MIDI](#) and come back to it on another day. It can also be useful to save your data at regular intervals in case the computer stops functioning or if there is a power cut in which situation you would lose all your new data entered since you last saved it.

To save your data you need to select “File” on the menu bar and then click on “Save” or you can press “Control” and “S” at the same time.

If this is the first time you have saved your data the standard Windows “get filename” [dialog box](#) will appear asking you for a filename. If the data already has a filename then the computer will go straight to the “Saving Data” dialog box in the figure below.

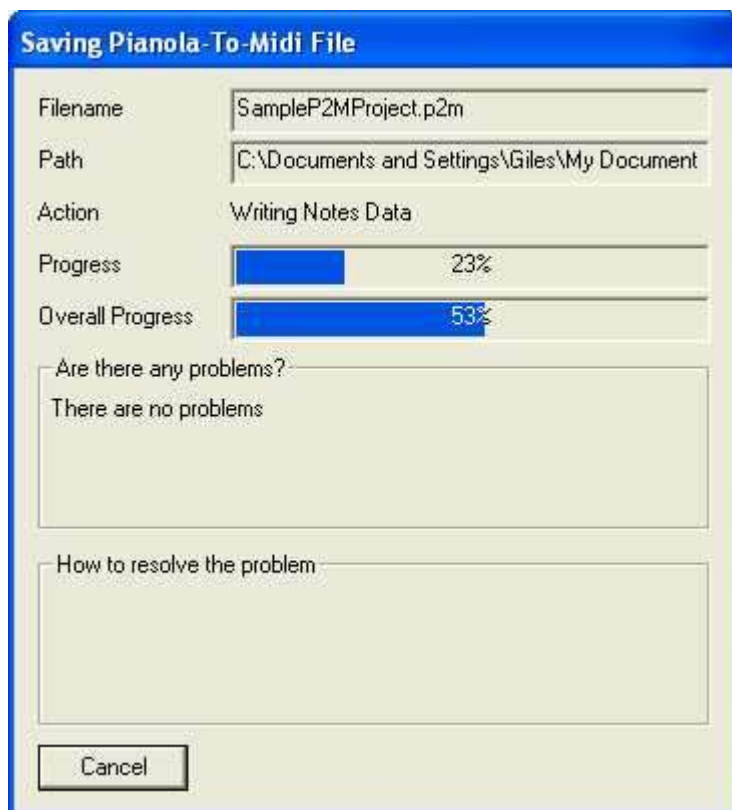


Figure 25

Saving Pianola-To-MIDI data

If an error occurs or a problem is encountered while saving the data then a description of the error or problem and advice on how to resolve it will appear in the two lower boxes in the dialog box above.

When the saving is finished you will need to click on the “Cancel” button which will have changed automatically to show “Close”.

If you wish to save your Pianola-To-MIDI data to a file with a different filename you need to select “File” on the menu bar and then click on “Save As...”. This will always show the standard Windows “get filename” dialog box and you will be able to enter a different filename.

Pianola to MIDI Version 2 imposes a restriction on the path that can be used when saving data. The [P2M](#) file created must be located in the same folder as the images that are attached to the [virtual pianola roll](#). This also applies when creating a different file using “Save As...”.

If you try to save into a different folder the following problem [dialog box](#) message will appear.

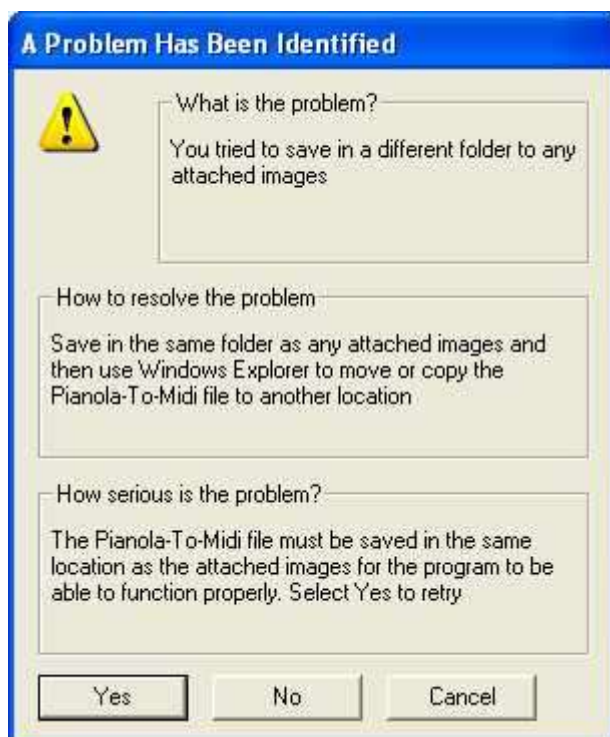


Figure 26

Showing the problem dialog box when trying to save to a different folder.

The top box describes the problem, the middle box advises how to resolve the problem, and the bottom box explains why the problem has occurred, how serious it is or what will happen if you do nothing.

The reason for this restriction is that the program does not store the path of the attached images within the saved data file.

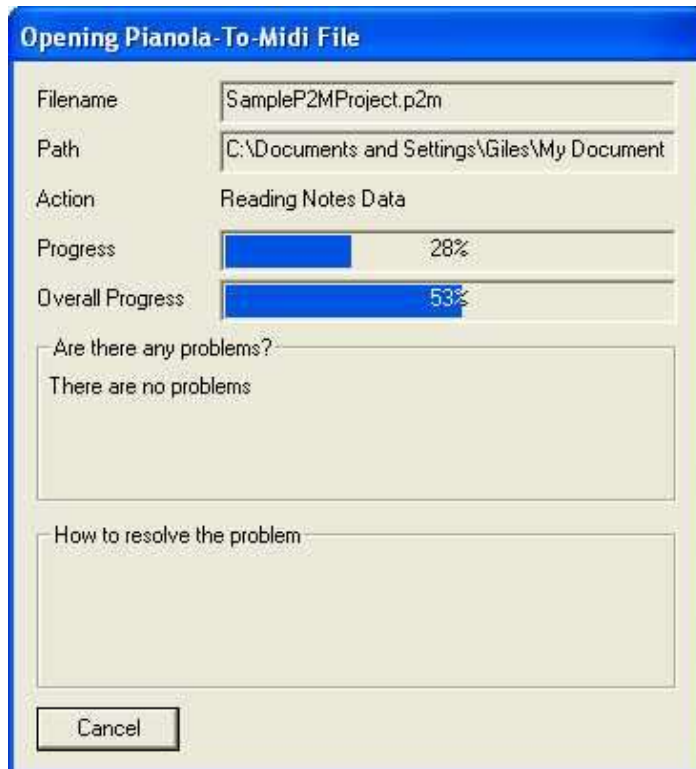
- The advantage of this is that you can move the images and the [P2M](#) data file to any folder on your computer even after creating the P2M data file.
- The only disadvantage is that the data file must always be located in the same folder as the images.

It is felt that the advantage is far more beneficial than the disadvantage.

Opening and closing a Pianola-To-MIDI data file

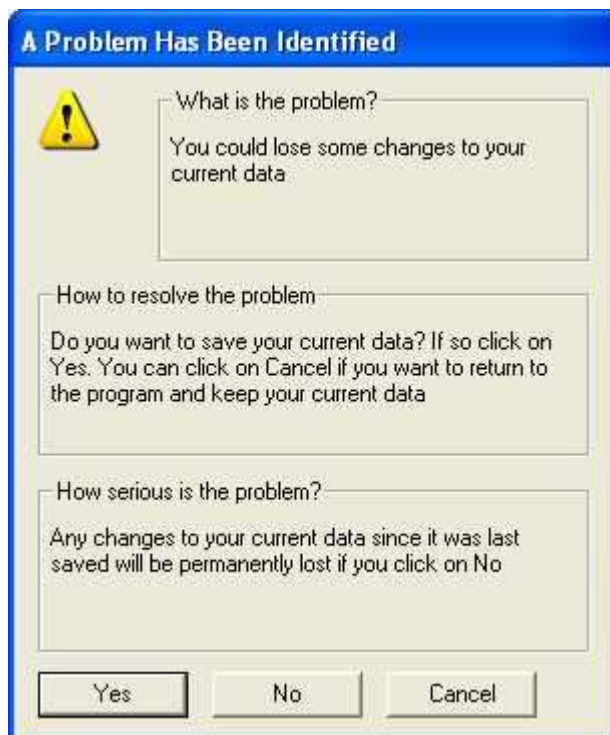
To **open** a Pianola-To-MIDI data file that you have saved before you need to select “File” on the menu bar and then click on “Open...”. The standard Windows “get filename” [dialog box](#) will appear asking for the filename.

After you have selected the file the “Opening data” [dialog box](#) in the figure below will appear. This dialog box shows the progress of opening the file and it also shows any errors or problems if the program is unable to open the file successfully.

**Figure 27**

Opening an existing Pianola-To-MIDI data file

To **close** your currently open Pianola-To-MIDI data file select “File” on the menu bar and then click on “Close”. This will close your current data file and the program will then contain empty or default data.

**Figure 28**

Checking whether to save any current unsaved data

If you attempt to open a file over unsaved data or try to close a file which has changed since it was last saved this dialog box will appear to check whether you wish to save the current data.

If you select “No” you will lose any unsaved data permanently.

Importing a Pianola to MIDI Version 1 File

This program enables you to import “Pianola to MIDI Version 1” files (with the filename extension [“.PIO”](#)) and save them as Pianola-To-MIDI data files (with the filename extension [“.P2M”](#)).

You can download the Pianola to MIDI Version 1 files from the www.gilesdarling.me.uk website.

Pianola to MIDI Version 1 files were created using an earlier version of this program written in 2004. That program did not include the feature of adjusting speed and volume through a piece of music.

Therefore using **Pianola to MIDI Version 2** you can adjust the speed and volume for different sections of the imported music and export it as a [MIDI](#) file containing these changes.

Importing a Pianola to MIDI Version 1 file

To import a Pianola to MIDI Version 1 data file select “File” on the menu bar and then click on “Import...”. The standard Windows “get filename” [dialog box](#) will appear asking you for the filename with the extension [“.PIO”](#).

After you have selected the file the program will automatically import the data. If an error or problem is encountered you will get a dialog box explaining the error and advising what action to take next.

Other default actions when importing data

Pianola to MIDI Version 2 does not include any attached images with the imported data file because Pianola to MIDI Version 1 used a different and incompatible system to create its [virtual pianola roll](#).

The program also changes the default background colour of the [detail window](#) and shows vertical [note bars](#) by default. These actions are done because without any attached images it would otherwise be difficult to identify [note starts and stops](#) with the normal default background colour.

Pianola to MIDI Version 1 files contain a single text item. This single text item is placed in the “*additional miscellaneous information*” section of the music details dialog box by default (see [“Entering music details”](#)).

Because Pianola to MIDI Version 1 files contain no [speed trace](#) or [volume trace](#) data, these traces are set to the default position.

Changing and saving the imported data

As well as changing the speed and volume traces you can also add, move, and remove notes, and you can change the instrument and other music details.

As well as exporting the data to a MIDI file you can also save the music as a **Pianola to MIDI Version 2** [P2M](#) data file.

Sample Pianola to MIDI Version 2 File

A sample **Pianola to MIDI Version 2** data file is available at the website www.gilesdarling.me.uk as a single zipped file.

The single zipped file contains the following six files:

- *SampleP2MProject.p2m* – this is the **Pianola to MIDI Version 2** [P2M](#) data file
- *SampleP2MProject01.jpg*, *SampleP2MProject02.jpg*, *SampleP2MProject03.jpg* and *SampleP2MProject04.jpg* – these are the four images that make up the [virtual pianola roll](#) used by *SampleP2MProject.p2m*.
- *SampleP2MProject.mid* – this is the [MIDI](#) file created by **Pianola to MIDI Version 2**.



Figure 29 – four images included in sample **Pianola to MIDI Version 2** file

The images include note holes that represent which notes are to be played and when, musical terms to indicate changes to volume and speed, and also a dotted line that represents changes in speed. This dotted line also happens to tie-in with the speed [trace](#) included in *SampleP2MProject.p2m*.

The music included in the sample file is a 30 second example that includes variations in speed and volume. It also shows the surround sound stereo effect.

Downloading the sample Pianola to MIDI Version 2 files

First you need to download the file “*SampleP2MProject.zip*” from the website www.gilesdarling.me.uk to a folder on your computer or to your computer's desktop.

The destination folder could be a new folder you have created just for this file or it could be the folder that you created to contain the program file (refer to the [“Installing the program”](#) section).

Next you need to extract the files from the zipped file, typically to the same folder. Refer to Windows Help or to WinZip Help if you need to find out how to extract data from a zipped file.

Now you can open the [P2M](#) file using **Pianola to MIDI version 2**. Refer to [“Opening and closing a Pianola-To-MIDI data file”](#).

For the sample files to work properly the [P2M](#) file must be in the same folder as the [JPG](#) image files.

Deleting the sample Pianola to MIDI Version 2 files

To remove the sample files from your computer you can delete them in the normal way using Windows Explorer.

Refer to Windows Help if you need to find out how to delete files.

Troubleshooting and Known Program Problems

The following problems are known to occur with the current version of **Pianola to MIDI Version 2**. The following table suggests ways to get around these problems.

Problem

Work around

After importing a .PIO file the note starts and stops sometimes do not display in the detail window or they disappear.	Try zooming in and out, or hiding and re-showing the overview window . This resets the detail window display, making the note starts and stops reappear
New nodes cannot be added to the volume or speed trace .	Refer to the section “Trace limitations” .
It's difficult to select note starts or stops or move them (using the mouse) because they're so small.	Try zooming in to increase the size of the rectangles that mark each note start and stop.
It's difficult to tell the selected note starts and stops from the non-selected note starts and stops.	Try changing the program colours to suit your requirements better.
It's difficult to tell apart all the different components in the detail window .	Try changing the program colours to suit your requirements better. You can also hide and re-show individual component types if the screen is becoming too full, or if you are having difficulty selecting an individual component in order to change it. Refer to “Summary of Keyboard and Mouse Button Input” in particular keys “1” to “8”.
When trying to add a new note start or stop near a trace , new trace nodes keep being added instead.	You need to hide the trace in order to add new note starts or stops under the trace. Refer to “Summary of Keyboard and Mouse Buffer Input” in particular keys “7” and “8”.
When trying to play an imported PIO file the program says that the “MIDI buffer is too big”.	Pianola To MIDI Version 2 uses the Windows Multimedia buffer to play MIDI music. This buffer has a 64 kilobyte size limit. Refer to “Playing Music” for ways to get round this. This does not affect any exported MIDI files.

Summary of Keyboard and Mouse Button Input

The following table lists the keyboard keys that interact with the program.

Key(s)	Action
Control + A	Select all note starts and stops
Control + C	Copy selected notes to the program's clipboard
Control + I	Zoom in
Control + L	Show colours dialog box
Control + O	Zoom out
Control + P	Swap start and stop values for selected note starts and stops
Control + R	Swap selected and non-selected note starts and stops
Control + S	Save data to a Pianola-To-MIDI P2M data file
Control + T	Show statistics dialog box
Control + V	Paste note starts and stops stored in program's clipboard
Control + W	Hide or re-show overview window
Control + X	Cut selected notes from detail window to program's clipboard
Control + Z	Undo or redo previous action
Delete	Delete selected note starts and stops
1	Hide or re-show attached images in detail window
2	Hide or re-show roll edge guides in detail window
3	Hide or re-show vertical note guides in detail window
4	Hide or re-show horizontal guides in detail window
5	Hide or re-show note starts and stops in detail window
6	Hide or re-show note bars in detail window
7	Hide or re-show volume trace in detail window
8	Hide or re-show speed trace in detail window
Left cursor key	Move selected note starts and stops one column to the left
Right cursor key	Move selected note starts and stops one column to the right
Up cursor key	Move selected note starts and stops up one pixel
Down cursor key	Move selected note starts and stops down one pixel
Page Up key	Move selected note starts and stops up ten pixels
Page Down key	Move selected note starts and stops down ten pixels
Escape	Stop playing music via MIDI output device
Control + left mouse button	Add new note stop
Shift + left mouse button	Add new note starts or stops to current notes selection

(Where + is shown this indicates that two keys should be pressed together.)

The following table shows the mouse button actions and how they interact with the program when the mouse button is clicked within the detail window.

Mouse button	Actions
Left button	(i) move attached images, (ii) move roll edge , (iii) move horizontal guide, (iv) add/select/move note starts and stops , (v) add/move trace nodes, (vi) draw note selection rectangle
Right button	Show menu pop-up: (i) zoom in, (ii) zoom out, (iii) delete single trace node, (iv) delete all trace's nodes.

Glossary of Terms Used

65-Note Pianola Roll – this a [pianola roll](#) that has a maximum range of 65 notes. The lowest note is usually the third G# below middle C and the highest note is usually the third C above middle C. This is a typical standard pianola roll note range, although many other standard ranges also existed.

A3, A4 – standard international paper sizes. A3 is 41.0cm x 29.7cm (16.14 inches by 11.69 inches). A4 is 29.7cm x 21.0cm (11.69 inches by 8.27 inches).

ANSI/ASCII – “American National Standard for Information” and “American Standard Code for Information Interchange” – standard formats for storing text or characters on computers or in data files. ANSI uses 8 bits per character and ASCII uses 7 bits per character which allows a character set to contain up to 256 or 128 different characters. MIDI files use 8 bits per character.

.BMP – standard Windows Bitmap file format for storing images. These files can be compressed but not to the same degree as [JPEG](#) or [TIFF](#). Therefore the file size is larger but the image quality can be better.

Clipboard – an imaginary clipboard (in the computer's memory) or storage area where data can be temporarily placed between different actions. **Pianola to MIDI Version 2** uses its own internal clipboard, not the Windows clipboard. Therefore it is not possible to transfer data from one Pianola-To-MIDI data file to another using the clipboard.

Delta Time – in [MIDI](#) files the time for each MIDI event (such as starting or stopping playing a note) is stored as a “delta time”. This is the time between each consecutive MIDI event. Therefore events that occur at the same time have a zero delta time. The time is not stored as a value measured from the start of the file (like a stopwatch). Delta time is measured in ticks. In **Pianola to MIDI Version 2** a tick lasts 5 milliseconds.

Detail Window – right-hand section of **Pianola to MIDI Version 2**'s main window. The detail window is where data is entered or changed and it shows all the program's components and the [virtual pianola roll](#).

Dialog Box – a small box that appears on your computer screen while using **Pianola to MIDI Version 2**. The dialog box will either tell you something, enable you to make choices, and/or allow you to enter information or data.

.EXE – “executable file” – standard filename extension for programs that run on computers using the Windows operating system.

Flatbed scanner – a type of [scanner](#).

Freeware – computer software that you can download from the Internet for free and which often has limited or no customer support.

JPEG – “Joint Photographic Experts Group” – a widespread standard file format for storing images as compressed data. The file size is smaller but the image quality can be reduced.

.JPG – common filename extension for [JPEG](#) files.

Megapixels – roughly a million pixels – on digital cameras megapixels are used to define the degree of detail to which a photograph is taken. A high number of

megapixels (e.g. 10) means more detail is captured but results in larger file sizes. A low number of megapixels (e.g. 3) means less detail is captured but results in smaller file sizes. The megapixels value is measured by multiplying together the width and height (in [pixels](#)) of the image created and rounding down to the nearest million. For example an image which is 2048 pixels wide by 1536 pixels high will contain 3,145,728 pixels. Therefore this image would be a 3 megapixel image.

MIDI – “Musical Instrument Digital Interface” – an industry standard file format for storing music as a series of timed “note start”, “note stop” (and many more) instructions, instead of a digitised sound recording. Advantages include much smaller file sizes. Disadvantages include much less control over the final sound which will depend on the device that plays the MIDI music.

MIDI Sequencer – a device that converts [MIDI](#) “note start”, “note stop” (and many more) instructions into audible music.

Note Bars – thick vertical lines that appear in the [detail window](#) between [note start](#) and [note stop](#) pairs.

Note Guides – vertical lines in the [detail window](#) that identify where each note column is located. The positions of the notes guides is set by the positions of the [roll edges](#).

Note Hole – a hole in a [pianola roll](#) that determines when and for how long a note plays.

Note Starts/Note Stops – the ends of each hole on the [virtual pianola roll](#). The holes on the virtual pianola roll represent the pitch and the timing of each note. One end of each hole is when the note starts playing. The other end of each hole is when the note stops playing.

Overview Window – left-hand section of **Pianola to MIDI Version 2**'s main window. The overview window shows the current location of the [detail window](#) relative to all the attached images.

.P2M – filename extension of data files created using **Pianola to MIDI Version 2**.

Pianola – a modified piano that enables people to play music without the need for any skill or ability to play the piano. The music is stored on “[pianola rolls](#)”. Pianolas were popular in the early 20th century and could be considered the equivalent of the CD or MP3 player of today.

Pianola Roll – a long, rolled up strip of paper that contains holes that represent notes when played using a [pianola](#). The position of each hole determines the pitch and timing of each note. The length of the hole determines how long the note plays for.

.PIO – filename extension of files created using Pianola To MIDI Version 1, written in 2004 and an earlier version of **Pianola to MIDI version 2**.

Pixel – refers to the smallest dot on your computer screen that can have a defined colour. Typically many computer screens will show 1280 pixels across by 1024 pixels down, although there are many other screen display dimensions available. “Pixel” also refers to the overall dimensions of a photographed or scanned image (x pixels wide by y pixels high).

Player Piano – another name for a [Pianola](#).

Portrait/Landscape – terms used to describe the orientation of a piece of paper. “Portrait” means that the short sides are along the top and bottom, as in the portrait of a person or a passport photograph. “Landscape” means that the long sides are along the top and bottom, as in the traditional painting of a landscape.

Registry – a central component of the Windows Operating System where settings for individual programs and individual users are stored.

Resolution – refers to the degree of detail to which a scanner captures an image. A high resolution (such as 600 DPI) means that very fine details are captured but it results in larger file sizes. A low resolution (such as 50 DPI) means less detail is captured but it results in smaller file sizes. Resolution is measured in DPI (dots per inch).

Roll edge – vertical lines in the [detail window](#) which should be aligned with the edge of the pianola roll on the images in the [virtual pianola roll](#).

Scanner – a device which scans flat objects, sending a photographic copy of the object digitally to your computer. Scanners can be hand-held or they can be a flatbed scanner which is like a photocopier in that it has a glass window where you place the object and a lid that you close over the object while scanning.

Selection Rectangle – a rectangle drawn around some [note starts or stops](#) in the [detail window](#) in order to select those note starts or stops in order to carry out some action on them.

Shareware – computer software that you can download from the Internet usually for a small fee and often with limited customer support.

.TIF – common filename extension for [TIFF](#) files.

TIFF – “Tag Image File Format” – a widespread standard file format for storing images as either compressed or non-compressed data.

Traces – Pianola to MIDI Version 2 contains a volume trace component and a speed trace component. These traces allow the user to change volume and speed at different locations on the virtual pianola roll. These traces are displayed in the [detail window](#).

Tracker Bar – part of a [pianola](#) that “reads” the holes within a [pianola roll](#). The tracker bar contains a row of holes, one per note. As the pianola roll passes over the tracker bar, when a hole is encountered a note is played.

Unicode text – a standard format for storing text or characters on computers or in data files. Unicode uses 16 bits per character which allows a character set to contain up to 65536 different characters. Current versions of Windows use Unicode text. Older versions of Windows use 8 bits per character which allow only 256 different characters in a character set.

Virtual Pianola Roll – created by combining a series of photographed or scanned images, the virtual pianola roll is what **Pianola to MIDI version 2** uses to recreate a physical piano roll on the computer screen. The virtual pianola roll is displayed in the [detail window](#).

Zoom – the magnification factor of items displayed in the [detail window](#).